



RECEIVED

MAY 10 2001

SEQUENCE LISTING

TECH CENTER 1600/2900

<110> Gopalan, Venkat
Jovanovic, Milan
Eder, Paul S.
Giordano, Tony
Powers, Gordon D.
Xavier, K. Asish

<120> Novel Bacterial Rnase P Proteins and
Their Use in Identifying Antibacterial Compounds

<130> 50093/016001

<140> US 09/516,061

<141> 2000-03-01

<160> 38

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 417

<212> DNA

<213> Streptococcus mutans

<400> 1

agatttttgg cttttttctca ttttatgata taatagtgat aatttaaata ttggagtcac 60
gttttgaaaa aagcctatcg cgttaaaagt gataaagatt ttcaggcaat ttttactgaa 120
ggacgaagtg ttgccaatcg gaaatttggt gtctatagtt tagaaaaaga tcaaagtcac 180
tatcgtgttg gactttcagt tggaaaaaga ttaggaaatg ctgtcgtag aaatgcgatt 240
aaacgaaaat tgcgccatgt ccttatggaa cttggtcctt atttaggcac tcaagatttt 300
gttggtattg ctagaaaagg tgttgaggaa ctgattata gcacgatgaa aaaaaatctg 360
gttcattgtt taaaactggc taaactgtat caggaaggat ctattcgtga aaaagaa 417

<210> 2

<211> 477

<212> DNA

<213> Klebsiella pneumoniae

<400> 2

cgctcgtcgtg ctaaaggccg cgctcgtctg accgtttcca agtaataaag ctaaccctgc 60
gtgggtaagc tcgcatttcc cagggagtta cgcttggtta cttccagtc tttcactttc 120
gtcttcacg agccacaacg ggctggcagc ccgcaaatca ccacctcgg ccgcctgaat 180
tcgctggggc atccccgcat cggtctcacc gtcgccaaga aaaacgtgaa acgcgcacat 240
gaacgcaatc ggattaaacg tctgacgcgt gaaagtttgc gtttgcgta acatgaactc 300
ccgccaatgg atttcgtggt ggtggcgaaa agaggggttg ccgacctga taaccgtgct 360
ctctcggaag cgttggaaaa attatggcgc cgccattgtc gcctggctcg cgggtcctga 420
tcggcctgat tcgagtttat cagcgcctga ttagtcctgt actcggggccg cattgtc 477

<210> 3

<211> 455

<212> DNA

<213> Salmonella paratyphi

<400> 3

ctgaccgttt	ccaagtaata	aagctaacce	ctgagtgggt	aagctcgcat	ttcccaggga	60
gttacgtttg	ttaactcccc	ctcatttcac	attcgtcttc	cagcaacctc	aacgggctgc	120
acgccgcaaa	tcaccatcct	cggccgcctg	aattogettg	ggcatccccg	tatcgggtctt	180
accgtcgcca	agaaaaatgt	tgcacgtgcg	catgaacgca	accggattaa	acgtctgacg	240
cgtgaaagct	tcggtctgcg	ccagcatgaa	cttcctgcaa	tggatttcgt	gggtggtggcg	300
aaaaaagggg	ttgccgacct	cgataaccgt	gctctctcgg	aagcgttggg	aaaattatgg	360
cgccgccact	gtccgctggc	tcgcgggtcc	tgatagccct	tattcgggtc	tatcaacgcc	420
tgatcagtc	gctgcttggg	cgcattgttc	gtttc			455

<210> 4

<211> 528

<212> DNA

<213> *Pseudomonas aeruginosa*

<400> 4

tctgtcgcgt	cgctcgcgca	aaggccgtaa	gcgtctgacc	gtctgattta	tccggtagcg	60
gtggtgagtc	gggacttcga	ccgggacaag	cgtctactga	cagcccgga	attcagcgca	120
gtcttcgact	ctccgaccgg	caaggctccc	ggcaagcagc	tcctgctgct	ggcgcgcgag	180
aacggctctcg	atcacccccg	cctgggcctg	gtgatcggca	agaagaacgt	caagctcgcc	240
gtccagcgca	atcgctctca	acgcctgac	cgcgaatcgt	tccgccataa	ccaggaaacc	300
ctggctggct	gggatatcgt	ggtgatcgcg	cgcaaaggcc	tgggcgaact	ggaaaatccg	360
gagctgcacc	agcagttcgg	caagctctgg	aaacgcctgt	tgcgcaatcg	acctcgcacg	420
gaaagccctg	ctgacgcccc	tggcgtggcc	gacggtactc	atgcataggt	cgatgcccgc	480
gcatcccgat	ccctgtagtg	tcaccccc	ttcgatgacc	cggcaccg		528

<210> 5

<211> 510

<212> DNA

<213> *Corynebacterium diphtheriae*

<400> 5

cgggtcgcgc	aatcgtggct	gcacgtccta	acaagggtcg	taagagcctg	accgcttaag	60
gtcactctta	caagctcgaa	tagaacgacg	gtgctacctt	cacagcacia	gtcagcaaat	120
tccgaacagt	tccgcgcaac	gattcgggaag	ggcaagcgtg	ctgggaggag	caccgtcgtt	180
cttcattttt	atgctgaggc	gaccgcgggc	aaccttgcaa	ccgcaggcgg	cccgcgattc	240
ggcctcgctg	tgtccaaggc	tgttggaagt	gctgtgactc	gtcaccgtgt	ttcgcggcag	300
ttaaggcacg	tagtaatcgc	tatgaaagac	cagttccag	cgtcatccca	tgttggtgtg	360
agggcgatac	cgccagcggc	gacagcaagt	tatgaggagt	tgcgggcaga	tgtgcaggca	420
gactcgcaca	agctcaaccg	caagcgataa	ggcgggtact	cgcctcgtg	ggctgggttag	480
tcgcgcattg	tttgatgcgg	tgcggttcta				510

<210> 6

<211> 504

<212> DNA

<213> *Chlamydia trachomatis*

<400> 6

gctacaaaaa	gtggaagaaa	tctttttaaat	cgctcgtgcc	gtcacggcag	acatttcctta	60
attgatctct	aagatctttc	atttgtgcat	cggttaactc	tacctaaaag	tgcccgctta	120
ttgaaacgta	aacaatttgt	ttacgtgcag	cgttgtgggc	aatattgtcg	tactgatcag	180
gcaactttac	gaatagttcc	ttctcgtcat	tcgaacatcc	gtaaagtagg	ggttactgtt	240
tctaaaaaat	ttgggaaagc	ccatcagcgc	aatcgcttta	aaagaattgt	gcgagaggct	300
tttaggcattg	tgcgaccaa	tcttcccgca	tgtcaagtgg	tagtgtctcc	taaagggggc	360
actctaccaa	atcttggtta	actatccgcg	gatcttctta	agcatattcc	agaggctttg	420
cctctcgcta	cttcttctaa	gtagtttttt	atcttggtca	aaaaataaaa	aaccattcca	480
cgctatagag	gcatggaatg	ggaa				504

<210> 7

<211> 492
<212> DNA
<213> *Vibrio cholerae*

<400> 7
ggcagcgtgg gccgataagt ggactaataa accactggta aagttttaca ataccaatgg 60
ctaaccacga gaagggcgag agaggcggtg ccatagtttg ccaagcaagt taaacagttc 120
ttcattgctc aaatcttgcg cgctcttttt ggcgatgaca acaaaatctt tgtttagccag 180
ttgattttga tgtaagcgaa agctttctct gcaataacgt ttgaatcgat tacggccgac 240
ggcagttttg atctgctttt taggaaccgc gagtcccaaa cgaggatgag aaagggttatt 300
agcgcgagcg atgattgtga gatgaggaga accagcactg tgagcttgct ggaagacttt 360
ttgataatgt tcgggagtta acaaacgtaa ctcccgattg aatgcgtacg tactcaaaat 420
aattcgagat tattttgaca ggcgcttacg gccttttgca cgacgtgcat tcagaacttt 480
acgaccgttc gc 492

<210> 8
<211> 492
<212> DNA
<213> *Neisseria gonorrhoea*

<400> 8
atgttccttg tatgggaaac ccgttgccgt ctgaaccttg cctgcagggt accgtttctga 60
tcatacctgt ttcccgcatc cggttgcggg gttgccgaac atgagttgtg ccagttccgc 120
ccttgccgtg tttgcggtag ccctgtcgaa ttccggcgag acgcgcacga cgaaatcctg 180
aggcggcagc cggtttttgt tcaatctgaa ccagtcgcgg atgacgcgtt tcatatagtt 240
ccgctcggtg gcgcgtttgg cgtttttttt gccgaccacc agaccgatgc ggggatggtc 300
cagcccggtg ccgtttgagc gcgaaacttg cagcaggtcg cggctgcggc ggtttctgaa 360
tgcaaaaacg gatgaaaaat catccgtttt taacaagcgg tactgccttc cgaagcggta 420
gtccaaaatt acactgccag gcgtttgcgg cttttggcac ggcgtgcggc caatactgcg 480
cgtccgcgcg gt 492

<210> 9
<211> 492
<212> DNA
<213> *Neisseria meningitidis*

<400> 9
tggtcccttag tatgggaaac ccgttgccgt ctgaaccttg cctgcagagt accgtttctga 60
tcatgcctgt ttctgcacg cggttgcggg gttgccgaac atgagttgtg ccagttccgc 120
ccttgccgtg tttgcggtag ccctgtcgaa ttacggcgag acgcgcacga cgaaatcctg 180
cggcggcagc cggtttttgt tcaatctgaa ccagtcgcgg atgacgcgtt tcatataatt 240
tcgttcgttg gcgcgtttgg cgtttttttt gccgaccacc agaccgatgc ggggatgatc 300
cagcccggtg ccgtttgaac gcgaaacttg cagcaggtcg cggctgcggc ggtttctgaa 360
tgcaaaaacg gatgaaaaat catccgtttt caacaagcgg tactgccttc cgaagcggta 420
gtccaaaatt acaccgccag gcgtttgcgg cttttggcgc gccgtgcggc caatactgcg 480
cgtccgcgcg gc 492

<210> 10
<211> 462
<212> DNA
<213> *Streptococcus pyogenes*

<400> 10
gttacctcac cagcaccaca ggccactaat aatagaacta aggggactat tcttgcaatt 60
ttaatgtttt tcttcactct caaaaccttt ctcaagcaat tgtgctaact ttaaaacatg 120
atgtaaatgt tgttgaagct cttgatactc caaagattcg acaccttac gggcaatcac 180
cacgaaatcc tctgacttca gctgatgcc taatgccatg ataacatgac gtatctttcg 240
tttgactgca tttctggtga ctgcatttcc tattttttta ccgacagaaa taccacacag 300

gaagtggctct tggcctctat ttaaattgata aatgacaaat tttcgatttg ctgtactttt 360
 tccatcctta aatatggctt ggaaatcttt ctcacgcttg acacgatagg tcttcttcaa 420
 aatttaactc caatatctaa attattacca ttataccaca tc 462

<210> 11
 <211> 492
 <212> DNA
 <213> Bordetella pertussis

<400> 11
 ccacccaggg gctgaggaag taccggtaaa accggatcgg ggcgataagc agtctcctga 60
 tcatcgcgct atccgtgtga agtgagcatc tacttcggcg cgcgccgagc gtttcagggc 120
 cgtgaggctt gccggtgtca gcttgctgtg cagccgcacc acgtaatcct gggccggcag 180
 ggcaagccgg cgagcccga acgcttcgcg gatgaccgcg ttcaagggtat tgcgcgtcac 240
 ggcgcgggcg gcaaaacgct tggcgatcac caggcccagg cgcgcgcgcg ccggttggtc 300
 atcagcaggg gcacagggcg aggcgctgac aataaagaaa gccctcggg ccagtcgccg 360
 gcctttgagg gcggcggcaa actcggaggg gcgatgcaat cgcgcctccg caggagcgt 420
 ggcgcgcggc atgggtgacg tgacggagac tggcgacggg gccggcgggc atgctcctgt 480
 tacaggcaat cc 492

<210> 12
 <211> 534
 <212> DNA
 <213> Porphyromonas gingivalis

<400> 12
 agaagaaaat ggggagcagt aagagttgca cgagaaaagc cttgatcagt cgcacgtat 60
 ttactcgttt ttcaaagccg atgaaggtagc atttcggca attctgatca gactcttttg 120
 catcgctctc tccactgtac gaaagtcagg aagttcatcc gatactacca taaatgcaat 180
 agtagcatag atctgtctct cttggaggac atcgttcagg aggtgtttgt tgagccgata 240
 agcctccctg accaaacgct tgaccctatt gcgcttcacg gctcgcctaa accttttctt 300
 tgctacgctt accagcatgg aggaatatgc aactcgatgc tccgatccca gacggtagac 360
 tacgcgtaga ggataaacga caaacgcctt gccttcgccca aagaccgtat tgatttcac 420
 gcgaagatag aggcgttcgc ttttgatag gccgaatgta ggcggagagg tcatctccc 480
 ttgaggtaat cctctaagc catagccata gaaggatatt gctcggtcgg cgca 534

<210> 13
 <211> 495
 <212> DNA
 <213> Streptococcus pneumoniae

<400> 13
 tcgctagtta cccattagt cgcacaggct gtcatgatta acagagacag tccatgcaaa 60
 ctagtcaact ttagtttctt tttcactccc atttccttcc cggtaaactt ttgataattt 120
 taatacatgg agtagatttt tctccatctc tgcgtatccc aaggtttcga ctcttttctg 180
 agcaatgaca acaaagtcga catcttctac cagactccct tttgcattct ggataaatatg 240
 ccgaatccgt cgcttaattt gatttctagt gacggcatte cccagttttt tgctaactga 300
 tagacctact cgaaaacggt ttttctggtt ttctaattgg tagaccacaa atttgcgatt 360
 agcaaaactt gtccctcctt tgaaaatcgc cttaaaatct ttctctcttt ttacacgaaa 420
 gtttttcttc aaaactcaac tccatctatt aaattactac tattatacca tatttttcaa 480
 aaaagccaat catag 495

<210> 14
 <211> 465
 <212> DNA
 <213> Clostridium difficile

<400> 14

tcctttaata	tataaattat	tttattcaaa	gtcattaacc	tccatattta	tagcatacaa	60
ttaaatagaa	atatccgttc	ttttaactaa	atTTTTtata	gacttgtcta	tgtcttttaa	120
agtagcatcc	ttactagata	cccttgctat	aaatactata	tcatatccag	gcttaatttt	180
ttcatcaata	tttaatctgt	aggcttcttt	tattaatctt	cttactctat	tcctagtaat	240
agcttttcct	actttttttg	aaacagaaat	acctactcta	ctataatctg	atTTtatttt	300
aagtatatat	attactaaat	atttgtttgc	aaaagatttg	ccgtgtttat	atacttttct	360
aaaatcagag	tcttttttca	accctttagt	cctattaaag	tccatagtta	acctccataa	420
acacagctat	gaatcgtaat	tatttacaca	aaaaggccac	ctttg		465

<210> 15
 <211> 447
 <212> DNA
 <213> Camphylobacter jejuni

<400> 15	
aagcagcggg	ttttaaaggg ctttaagaatt tctgataaaa acggagtatt tttaggcata 60
tcatttgaaa	cattctagtt ttttcaatcc ccattttaga tttttttcta acctagaaaa 120
agaaagttca	gtgatttcat ttttagctac aaaaatatat ttgccatctt gaagatatct 180
ttcaaactta	gcaaacaaag ctcttaaaat tctgttttgaa cgattttctaa ccaactgcttt 240
tccaactttt	ttactagcaa caactgctat ttttttttca taactattca gataaaaaat 300
gatcacacct	tgcgaatgcc attttttgcc tactttatat acagatgaaa attcctcggt 360
tgtgctaaat	ttatcaaaat ttttcacaca gcaagtcttt ttctaccttt agcgcgctct 420
gcattgatca	ctttgcgacc attttta 447

<210> 16
 <211> 480
 <212> DNA
 <213> Baccillus anthracis

<400> 16	
taaaccta	ttctttttca aagcctactc ctcttgtat cgggatgtat atagtgtaat 60
tcatttcctt	acgctacttt ttattctttt cataccagag cgtttaaaga catgaattaa 120
gcttttcttt	aattcttcat atgtcatctc tgcacaaggc ttcttgtcta ttataacaaa 180
atcttttcca	gaatctatct catcttttaa ttctgtgatc gactggcgaa tcatacgttt 240
aattcgggta	cgcactactg catttcttat ctcttctgtg acagaaaggc caatacgaaa 300
gtttggctgc	tcttctttat ctagtgtgata gacaacaaat tgacgattcg cattcgattt 360
tcctttttga	aaaaccgtct ggaattcatc attctttttt atacgatgtt ttttcttcat 420
atcaattgac	actcctgtag ttcatcagcg gaaattcact attattagaa aaaaagacca 480

<210> 17
 <211> 480
 <212> DNA
 <213> Mycobacterium avium

<400> 17	
gtccgcgggc	gacgggttcgg cgggcgcgcgc gaatggcgcg gcccgaccgc gccgggtccgg 60
tcacggcccc	gttccccgcg gcatgcgcgc caggcaccgc tgcagttcct gcgccaggcg 120
cgccgacgac	gcgggtccgc ttccgggcag cgcgcgaatc accagccggg cggatgggtc 180
gagttcgccg	agcagggccc gggccacgtg acgcagccgg cgggccacgc ggtgtcggtg 240
caccgcccgc	ccgacggcct tcccgcgac cagcccgacc cgtggggccc cggattcgct 300
gtcgggttcg	gagtcgcgcc ggaggtggac gacgatgtcg ggctgcgcca tgcgggttcc 360
gtgcttcacc	gtcgcgtcaa actcgggtga ccgcgtcatg cggttgcgtg cgggaagcac 420
cgcgaaagac	ctgacgtgcg atcaggcaga gacgcgcgcg cgacccttgc ggcgcgcgacc 480

<210> 18
 <211> 474

<212> DNA

<213> Staphylococcus aureus

<400> 18

gttataagct caatagaagt tttaaataatag cttcaaataa aaacgataaa taagcgagtg 60
atgttattgg aaaaagctta ccgaattaaa aagaatgcag attttcagag aatatataaa 120
aaaggtcatt ctgtagccaa cagacaattt gttgtatata cttgtaataa taaagaaata 180
gaccattttc gcttaggtat tagtgtttct aaaaaactag gtaatgcagt gttaagaaac 240
aagattaaaa gagcaatagc tgaaaatttc aaagtacata agtcgcatat attggccaaa 300
gatattattg taatagcaag acagccagct aaagatatga cgactttaca aatacagaat 360
agtcttgagc acgtacttaa aattgccaaa gtttttaata aaaagattaa gtaaggatag 420
ggtaggggaa ggaaaacatt aaccactcaa cacatcccga agtcttacct caga 474

<210> 19

<211> 474

<212> DNA

<213> Staphylococcus aureus

<400> 19

gttataagct caatagaagt tttaaataatag cttcaaataa aaacgataaa taagcgagtg 60
atgttattgg aaaaagctta ccgaattaaa aagaatgcag attttcagag aatatataaa 120
aaaggtcatt ctgtagccaa cagacaattt gttgtatata cttgtaataa taaagaaata 180
gaccattttc gcttaggtat tagtgtttct aaaaaactag gtaatgcagt gttaagaaac 240
aagattaaaa gagcaatagc tgaaaatttc aaagtacata agtcgcatat attggccaaa 300
gatattattg taatagcaag acagccagct aaagatatga cgactttaca aatacagaat 360
agtcttgagc acgtacttaa aattgccaaa gtttttaata aaaagattaa gtaaggatag 420
ggtaggggaa ggaaaacatt aaccactcaa cacatcccga agtcttacct caga 474

<210> 20

<211> 119

<212> PRT

<213> Streptococcus mutans

<400> 20

Val Leu Lys Lys Ala Tyr Arg Val Lys Ser Asp Lys Asp Phe Gln Ala
1 5 10 15
Ile Phe Thr Glu Gly Arg Ser Val Ala Asn Arg Lys Phe Val Val Tyr
20 25 30
Ser Leu Glu Lys Asp Gln Ser His Tyr Arg Val Gly Leu Ser Val Gly
35 40 45
Lys Arg Leu Gly Asn Ala Val Val Arg Asn Ala Ile Lys Arg Lys Leu
50 55 60
Arg His Val Leu Met Glu Leu Gly Pro Tyr Leu Gly Thr Gln Asp Phe
65 70 75 80
Val Val Ile Ala Arg Lys Gly Val Glu Glu Leu Asp Tyr Ser Thr Met
85 90 95
Lys Lys Asn Leu Val His Val Leu Lys Leu Ala Lys Leu Tyr Gln Glu
100 105 110
Gly Ser Ile Arg Glu Lys Glu
115

<210> 21

<211> 119

<212> PRT

<213> Klebsiella pneumoniae

<400> 21

Val Val Lys Leu Ala Phe Pro Arg Glu Leu Arg Leu Leu Thr Pro Ser
 1 5 10 15
 His Phe Thr Phe Val Phe Gln Gln Pro Gln Arg Ala Gly Thr Pro Gln
 20 25 30
 Ile Thr Ile Leu Gly Arg Leu Asn Ser Leu Gly His Pro Arg Ile Gly
 35 40 45
 Leu Thr Val Ala Lys Lys Asn Val Lys Arg Ala His Glu Arg Asn Arg
 50 55 60
 Ile Lys Arg Leu Thr Arg Glu Ser Phe Arg Leu Arg Gln His Glu Leu
 65 70 75 80
 Pro Pro Met Asp Phe Val Val Val Ala Lys Arg Gly Val Ala Asp Leu
 85 90 95
 Asp Asn Arg Ala Leu Ser Glu Ala Leu Glu Lys Leu Trp Arg Arg His
 100 105 110
 Cys Arg Leu Ala Arg Gly Ser
 115

<210> 22
 <211> 110
 <212> PRT
 <213> Salmonella paratyphi

<400> 22
 Val Thr Phe Val Asn Ser Arg Ser Phe His Ile Arg Leu Pro Ala Thr
 1 5 10 15
 Ser Thr Gly Cys Thr Pro Gln Ile Thr Ile Leu Gly Arg Leu Asn Ser
 20 25 30
 Leu Gly His Pro Arg Ile Gly Leu Thr Val Ala Lys Lys Asn Val Arg
 35 40 45
 Arg Ala His Glu Arg Asn Arg Ile Lys Arg Leu Thr Arg Glu Ser Phe
 50 55 60
 Arg Leu Arg Gln His Glu Leu Pro Ala Met Asp Phe Val Val Val Ala
 65 70 75 80
 Lys Lys Gly Val Ala Asp Leu Asp Asn Arg Ala Leu Ser Glu Ala Leu
 85 90 95
 Glu Lys Leu Trp Arg Arg His Cys Arg Leu Ala Arg Gly Ser
 100 105 110

<210> 23
 <211> 135
 <212> PRT
 <213> Pseudomonas aeruginosa

<400> 23
 Val Val Ser Arg Asp Phe Asp Arg Asp Lys Arg Leu Leu Thr Ala Arg
 1 5 10 15
 Gln Phe Ser Ala Val Phe Asp Ser Pro Thr Gly Lys Val Pro Gly Lys
 20 25 30
 His Val Leu Leu Leu Ala Arg Glu Asn Gly Leu Asp His Pro Arg Leu
 35 40 45
 Gly Leu Val Ile Gly Lys Lys Asn Val Lys Leu Ala Val Gln Arg Asn
 50 55 60
 Arg Leu Lys Arg Leu Ile Arg Glu Ser Phe Arg His Asn Gln Glu Thr
 65 70 75 80
 Leu Ala Gly Trp Asp Ile Val Val Ile Ala Arg Lys Gly Leu Gly Glu
 85 90 95

Leu Glu Asn Pro Glu Leu His Gln Gln Phe Gly Lys Leu Trp Lys Arg
 100 105 110
 Leu Leu Arg Asn Arg Pro Arg Thr Glu Ser Pro Ala Asp Ala Pro Gly
 115 120 125
 Val Ala Asp Gly Thr His Ala
 130 135

<210> 24
 <211> 129
 <212> PRT
 <213> Corynebacterium diphtheriae

<400> 24
 Val Thr Leu Thr Ser Ser Asn Arg Thr Thr Val Leu Pro Ser Gln His
 1 5 10 15
 Lys Leu Ser Asn Ser Glu Gln Phe Arg Ala Thr Ile Arg Lys Gly Lys
 20 25 30
 Arg Ala Gly Arg Ser Thr Val Val Leu His Phe Tyr Ala Glu Ala Thr
 35 40 45
 Ala Gly Asn Leu Ala Thr Ala Gly Gly Pro Arg Phe Gly Leu Val Val
 50 55 60
 Ser Lys Ala Val Gly Asn Ala Val Thr Arg His Arg Val Ser Arg Gln
 65 70 75 80
 Leu Arg His Val Val Ile Ala Met Lys Asp Gln Phe Pro Ala Ser Ser
 85 90 95
 His Val Val Val Arg Ala Ile Pro Pro Ala Ala Thr Ala Ser Tyr Glu
 100 105 110
 Glu Leu Arg Ala Asp Val Gln Ala Ala Leu Asp Lys Leu Asn Arg Lys
 115 120 125
 Arg

<210> 25
 <211> 119
 <212> PRT
 <213> Chlamydia trachomatis

<400> 25
 Val His Arg Leu Thr Leu Pro Lys Ser Ala Arg Leu Leu Lys Arg Lys
 1 5 10 15
 Gln Phe Val Tyr Val Gln Arg Cys Gly Gln Tyr Cys Arg Thr Asp Gln
 20 25 30
 Ala Thr Leu Arg Ile Val Pro Ser Arg His Ser Asn Ile Arg Lys Val
 35 40 45
 Gly Val Thr Val Ser Lys Lys Phe Gly Lys Ala His Gln Arg Asn Arg
 50 55 60
 Phe Lys Arg Ile Val Arg Glu Ala Phe Arg His Val Arg Pro Asn Leu
 65 70 75 80
 Pro Ala Cys Gln Val Val Val Ser Pro Lys Gly Gly Thr Leu Pro Asn
 85 90 95
 Phe Gly Lys Leu Ser Ala Asp Leu Leu Lys His Ile Pro Glu Ala Leu
 100 105 110
 Pro Leu Val Thr Ser Ser Lys
 115

<210> 26
 <211> 122
 <212> PRT
 <213> *Vibrio cholerae*

<400> 26
 Ser Arg Ile Ile Leu Ser Thr Tyr Ala Phe Asn Arg Glu Leu Arg Leu
 1 5 10 15
 Leu Thr Pro Glu His Tyr Gln Lys Val Phe Gln Gln Ala His Ser Ala
 20 25 30
 Gly Ser Pro His Leu Thr Ile Ile Ala Arg Ala Asn Asn Leu Ser His
 35 40 45
 Pro Arg Leu Gly Leu Ala Val Pro Lys Lys Gln Ile Lys Thr Ala Val
 50 55 60
 Gly Arg Asn Arg Phe Lys Arg Ile Cys Arg Glu Ser Phe Arg Leu His
 65 70 75 80
 Gln Asn Gln Leu Ala Asn Lys Asp Phe Val Val Ile Ala Lys Lys Ser
 85 90 95
 Ala Gln Asp Leu Ser Asn Glu Glu Leu Phe Asn Leu Leu Gly Lys Leu
 100 105 110
 Trp Gln Arg Leu Ser Arg Pro Ser Arg Gly
 115 120

<210> 27
 <211> 123
 <212> PRT
 <213> *Neisseria gonorrhoea*

<400> 27
 Val Ile Leu Asp Tyr Arg Phe Gly Arg Gln Tyr Arg Leu Leu Lys Thr
 1 5 10 15
 Asp Asp Phe Ser Ser Val Phe Ala Phe Arg Asn Arg Arg Ser Arg Asp
 20 25 30
 Leu Leu Gln Val Ser Arg Ser Asn Gly Leu Asp His Pro Arg
 35 40 45
 Ile Gly Leu Val Val Gly Lys Lys Thr Ala Lys Arg Ala Asn Glu Arg
 50 55 60
 Asn Tyr Met Lys Arg Val Ile Arg Asp Trp Phe Arg Leu Asn Lys Asn
 65 70 75 80
 Arg Leu Pro Pro Gln Asp Phe Val Val Arg Val Arg Arg Lys Phe Asp
 85 90 95
 Arg Ala Thr Ala Lys Gln Ala Arg Ala Glu Leu Ala Gln Leu Met Phe
 100 105 110
 Gly Asn Pro Ala Thr Gly Cys Gly Lys Gln Val
 115 120

<210> 28
 <211> 123
 <212> PRT
 <213> *Neisseria meningitidis*

<400> 28
 Val Ile Leu Asp Tyr Arg Phe Gly Arg Gln Tyr Arg Leu Leu Lys Thr
 1 5 10 15
 Asp Asp Phe Ser Ser Val Phe Ala Phe Arg Asn Arg Arg Ser Arg Asp
 20 25 30

Leu Leu Gln Val Ser Arg Ser Asn Gly Asn Gly Leu Asp His Pro Arg
 35 40 45
 Ile Gly Leu Val Val Gly Lys Lys Thr Ala Lys Arg Ala Asn Glu Arg
 50 55 60
 Asn Tyr Met Lys Arg Val Ile Arg Asp Trp Phe Arg Leu Asn Lys Asn
 65 70 75 80
 Arg Leu Pro Pro Gln Asp Phe Val Val Arg Val Arg Arg Lys Phe Asp
 85 90 95
 Arg Ala Thr Ala Lys Gln Ala Arg Ala Glu Leu Ala Gln Leu Met Phe
 100 105 110
 Gly Asn Pro Ala Thr Gly Cys Arg Lys Gln Ala
 115 120

<210> 29
 <211> 113
 <212> PRT
 <213> Streptococcus pyogenes

<400> 29
 Val Lys Arg Glu Lys Asp Phe Gln Ala Ile Phe Lys Asp Gly Lys Ser
 1 5 10 15
 Thr Ala Asn Arg Lys Phe Val Ile Tyr His Leu Asn Arg Gly Gln Asp
 20 25 30
 His Phe Arg Val Gly Ile Ser Val Gly Lys Lys Ile Gly Asn Ala Val
 35 40 45
 Thr Arg Asn Ala Val Lys Arg Lys Ile Arg His Val Ile Met Ala Leu
 50 55 60
 Gly His Gln Leu Lys Ser Glu Asp Phe Val Val Ile Ala Arg Lys Gly
 65 70 75 80
 Val Glu Ser Leu Glu Tyr Gln Glu Leu Gln Gln Asn Leu His His Val
 85 90 95
 Leu Lys Leu Ala Gln Leu Leu Glu Lys Gly Phe Glu Ser Glu Glu Lys
 100 105 110
 His

<210> 30
 <211> 123
 <212> PRT
 <213> Bordetella pertussis

<400> 30
 Met Pro Arg Ala Thr Leu Pro Ala Glu Ala Arg Leu His Arg Pro Ser
 1 5 10 15
 Glu Phe Ala Ala Ala Leu Lys Gly Arg Arg Leu Ala Arg Gly Ala Phe
 20 25 30
 Phe Ile Val Ser Ala Ser Pro Cys Ala Pro Ala Asp Asp Gln Pro Ala
 35 40 45
 Arg Ala Arg Leu Gly Leu Val Ile Ala Lys Arg Phe Ala Ala Arg Ala
 50 55 60
 Val Thr Arg Asn Thr Leu Lys Arg Val Ile Arg Glu Ala Phe Arg Ala
 65 70 75 80
 Arg Arg Leu Ala Leu Pro Ala Gln Asp Tyr Val Val Arg Leu His Ser
 85 90 95
 Lys Leu Thr Pro Ala Ser Leu Thr Ala Leu Lys Arg Ser Ala Arg Ala
 100 105 110

Glu Val Asp Ala His Phe Thr Arg Ile Ala Arg
115 120

<210> 31
<211> 137
<212> PRT
<213> Porphyromonas gingivalis

<400> 31
Met Thr Ser Pro Pro Thr Phe Gly Leu Ser Lys Ser Glu Arg Leu Tyr
1 5 10 15
Leu Arg Asp Glu Ile Asn Thr Val Phe Gly Glu Gly Lys Ala Phe Val
20 25 30
Val Tyr Pro Leu Arg Val Val Tyr Arg Leu Gly Ser Glu His Arg Val
35 40 45
Ala Tyr Ser Ser Met Leu Val Ser Val Ala Lys Lys Arg Phe Arg Arg
50 55 60
Ala Val Lys Arg Asn Arg Val Lys Arg Leu Val Arg Glu Ala Tyr Arg
65 70 75 80
Leu Asn Lys His Leu Leu Asn Asp Val Leu Gln Glu Arg Gln Ile Tyr
85 90 95
Ala Thr Ile Ala Phe Met Val Val Ser Asp Glu Leu Pro Asp Phe Arg
100 105 110
Thr Val Glu Arg Ala Met Gln Lys Ser Leu Ile Arg Ile Ala Gly Asn
115 120 125
Val Pro Ser Ser Ala Leu Lys Asn Glu
130 135

<210> 32
<211> 124
<212> PRT
<213> Streptococcus pneumoniae

<400> 32
Val Leu Lys Lys Asn Phe Arg Val Lys Arg Glu Lys Asp Phe Lys Ala
1 5 10 15
Ile Phe Lys Glu Gly Thr Ser Phe Ala Asn Arg Lys Phe Val Val Tyr
20 25 30
Gln Leu Glu Asn Gln Lys Asn Arg Phe Arg Val Gly Leu Ser Val Ser
35 40 45
Lys Lys Leu Gly Asn Ala Val Thr Arg Asn Gln Ile Lys Arg Arg Ile
50 55 60
Arg His Ile Ile Gln Asn Ala Lys Gly Ser Leu Val Glu Asp Val Asp
65 70 75 80
Phe Val Val Ile Ala Arg Lys Gly Val Glu Thr Leu Gly Tyr Ala Glu
85 90 95
Met Glu Lys Asn Leu Leu His Val Leu Lys Leu Ser Lys Ile Tyr Arg
100 105 110
Glu Gly Asn Gly Ser Glu Lys Glu Thr Lys Val Asp
115 120

<210> 33
<211> 114
<212> PRT
<213> Clostridium difficile

<400> 33
 Met Asp Phe Asn Arg Thr Lys Gly Leu Lys Lys Asp Ser Asp Phe Arg
 1 5 10 15
 Lys Val Tyr Lys His Gly Lys Ser Phe Ala Asn Lys Tyr Leu Val Ile
 20 25 30
 Tyr Ile Leu Lys Asn Lys Ser Asp Tyr Ser Arg Val Gly Ile Ser Val
 35 40 45
 Ser Lys Lys Val Gly Lys Ala Ile Thr Arg Asn Arg Val Arg Arg Leu
 50 55 60
 Ile Lys Glu Ala Tyr Arg Leu Asn Ile Asp Glu Lys Ile Lys Pro Gly
 65 70 75 80
 Tyr Asp Ile Val Phe Ile Ala Arg Val Ser Ser Lys Asp Ala Thr Phe
 85 90 95
 Lys Asp Ile Asp Lys Ser Ile Lys Asn Leu Val Lys Arg Thr Asp Ile
 100 105 110
 Ser Ile

<210> 34
 <211> 108
 <212> PRT
 <213> Camphylobacter jejuni

<400> 34
 Val Lys Asn Phe Asp Lys Phe Ser Thr Asn Glu Glu Phe Ser Ser Val
 1 5 10 15
 Tyr Lys Val Gly Lys Lys Trp His Cys Glu Gly Val Ile Ile Phe Tyr
 20 25 30
 Leu Asn Ser Tyr Glu Lys Lys Ile Ala Val Val Ala Ser Lys Lys Val
 35 40 45
 Gly Lys Ala Val Val Arg Asn Arg Ser Lys Arg Ile Leu Arg Ala Leu
 50 55 60
 Phe Ala Lys Phe Glu Arg Tyr Leu Gln Asp Gly Lys Tyr Ile Phe Val
 65 70 75 80
 Ala Lys Asn Glu Ile Thr Glu Leu Ser Phe Ser Arg Leu Glu Lys Asn
 85 90 95
 Leu Lys Trp Gly Leu Lys Lys Leu Glu Cys Phe Lys
 100 105

<210> 35
 <211> 119
 <212> PRT
 <213> Bacillus anthracis

<400> 35
 Met Lys Lys Lys His Arg Ile Lys Lys Asn Asp Glu Phe Gln Thr Val
 1 5 10 15
 Phe Gln Lys Gly Lys Ser Asn Ala Asn Arg Gln Phe Val Val Tyr Gln
 20 25 30
 Leu Asp Lys Glu Glu Gln Pro Asn Phe Arg Ile Gly Leu Ser Val Ser
 35 40 45
 Lys Lys Ile Gly Asn Ala Val Val Arg Asn Arg Ile Lys Arg Met Ile
 50 55 60
 Arg Gln Ser Ile Thr Glu Leu Lys Asp Glu Ile Asp Ser Gly Lys Asp
 65 70 75 80
 Phe Val Ile Ile Ala Arg Lys Pro Cys Ala Glu Met Thr Tyr Glu Glu

85 90 95
 Leu Lys Lys Ser Leu Ile His Val Phe Lys Arg Ser Gly Met Lys Arg
 100 105 110
 Ile Lys Ser Ser Val Arg Lys
 115

<210> 36
 <211> 119
 <212> PRT
 <213> Mycobacterium avium

<400> 36
 Val Leu Pro Ala Arg Asn Arg Met Thr Arg Ser Thr Glu Phe Asp Ala
 1 5 10 15
 Thr Val Lys His Gly Thr Arg Met Ala Gln Pro Asp Ile Val Val His
 20 25 30
 Leu Arg Arg Asp Ser Glu Pro Asp Asp Glu Ser Ala Gly Pro Arg Val
 35 40 45
 Gly Leu Val Val Gly Lys Ala Val Gly Thr Ala Val Gln Arg His Arg
 50 55 60
 Val Ala Arg Arg Leu Arg His Val Ala Arg Ala Leu Leu Gly Glu Leu
 65 70 75 80
 Glu Pro Ser Asp Arg Leu Val Ile Arg Ala Leu Pro Gly Ser Arg Thr
 85 90 95
 Ala Ser Ser Ala Arg Leu Ala Gln Glu Leu Gln Arg Cys Leu Arg Arg
 100 105 110
 Met Pro Ala Gly Thr Gly Pro
 115

<210> 37
 <211> 117
 <212> PRT
 <213> Staphylococcus aureus

<400> 37
 Met Leu Leu Glu Lys Ala Tyr Arg Ile Lys Lys Asn Ala Asp Phe Gln
 1 5 10 15
 Arg Ile Tyr Lys Lys Gly His Ser Val Ala Asn Arg Gln Phe Val Val
 20 25 30
 Tyr Thr Cys Asn Asn Lys Glu Ile Asp His Phe Arg Leu Gly Ile Ser
 35 40 45
 Val Ser Lys Lys Leu Gly Asn Ala Val Leu Arg Asn Lys Ile Lys Arg
 50 55 60
 Ala Ile Arg Glu Asn Phe Lys Val His Lys Ser His Ile Leu Ala Lys
 65 70 75 80
 Asp Ile Ile Val Ile Ala Arg Gln Pro Ala Lys Asp Met Thr Thr Leu
 85 90 95
 Gln Ile Gln Asn Ser Leu Glu His Val Leu Lys Ile Ala Lys Val Phe
 100 105 110
 Asn Lys Lys Ile Lys
 115

<210> 38
 <211> 117
 <212> PRT

<213> Staphylococcus aureus

<400> 38

Met Leu Leu Glu Lys Ala Tyr Arg Ile Lys Lys Asn Ala Asp Phe Gln
1 5 10 15
Arg Ile Tyr Lys Lys Gly His Ser Val Ala Asn Arg Gln Phe Val Val
20 25 30
Tyr Thr Cys Asn Asn Lys Glu Ile Asp His Phe Arg Leu Gly Ile Ser
35 40 45
Val Ser Lys Lys Leu Gly Asn Ala Val Leu Arg Asn Lys Ile Lys Arg
50 55 60
Ala Ile Arg Glu Asn Phe Lys Val His Lys Ser His Ile Leu Ala Lys
65 70 75 80
Asp Ile Ile Val Ile Ala Arg Gln Pro Ala Lys Asp Met Thr Thr Leu
85 90 95
Gln Ile Gln Asn Ser Leu Glu His Val Leu Lys Ile Ala Lys Val Phe
100 105 110
Asn Lys Lys Ile Lys
115